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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,761	10/16/2003	Yasushi Kanai	IIW-034	1977
959 7590 07/13/2007 LAHIVE & COCKFIELD, LLP ONE POST OFFICE SQUARE BOSTON, MA 02109-2127			EXAMINER ONEILL, KARIE AMBER	
			ART UNIT 1745	PAPER NUMBER
			MAIL DATE 07/13/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/688,761	<b>Applicant(s)</b> KANAI ET AL.	
	<b>Examiner</b> Karie O'Neill	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-16 is/are allowed.
- 6) ☒ Claim(s) 1-4, 7 and 17-20 is/are rejected.
- 7) ☒ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### **DETAILED ACTION**

1. The Applicant's amendment filed on March 22, 2007, was received. Claims 1, 8, 18 and 20 were amended. Therefore, Claims 1-20 are pending in this office action.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 103***

3. The rejection of Claims 1, 2, 3, 7 and 17 under 35 U.S.C. 103(a) by Yamamoto et al. (US 2003/0077488 A1) and Claims 4-6 under Yamamoto et al. (US 2003/0077488 A1) in view of Yamamoto et al. (US 2003/071221) have been withdrawn, because the Terminal Disclaimer, filed April 5, 2007, has been approved.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizumi et al. (US 2002/0094469 A1).

Yoshizumi et al. discloses a method of discharging hydrogen-off gas from a fuel cell. A method of discharging hydrogen off-gas to the atmosphere according to the following: a fuel cell is supplied with hydrogen gas and oxidative gas which generates

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electric power using the hydrogen gas and the oxidative gas, and discharges hydrogen-off gas and oxygen-off gas that have been consumed. In particular, this method comprises the steps of mixing the hydrogen-off gas discharged from the fuel cell with the discharged oxygen-off gas, and discharging the mixed gases to the atmosphere (paragraph 12). The oxygen-off gas and hydrogen-off gas are mixed in the mixing portion (411) of reservoir before being released into atmosphere (paragraph 12).

Yoshizumi et al. do not explicitly state that the location of the agitating gas introduction inlet. However, it has been held by the courts that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

The amendment to Claim 1, "hydrogen gas intermittently purged from the fuel cell", has been construed as a product-by-process claim, since the claim is directed to an exhaust gas processing device. Product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Since the Yoshizumi et al. exhaust gas processing device is similar to that of the Applicant's, Applicant's process is not given patentable weight in this claim.

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With regard to Claim 4, Yoshizumi et al. disclose an exhaust gas pipe (503) adapted to carry cathode exhaust gas discharged from the fuel cell, said exhaust gas pipe extends through a part of the reservoir and wherein the exhaust gas pipe includes at least one hole positioned within the reservoir. The exhaust gas pipe has at least one hole at either end of the pipe for which the gas enters from the fuel cell system or exits to the reservoir, regardless of where the exact location of the hole is. As stated above in Claim 1, the rearranging of parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

6. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizumi et al. (US 2002/0094469 A1), as applied to Claims 1, 4, 7 and 17 above, and in further view of Blaszczyk et al. (US 6,926,987 B2).

Yoshizumi et al. disclose the exhaust gas processing device in paragraph 5 above, but do not disclose the introduction of fresh cathode gas to the hydrogen diluter.

Blaszczyk et al. disclose a fuel cell system and a method of operating the fuel cell system. The fuel cell had a hydrogen and oxygen feed (column 2 lines 30-39). The anode and/or cathode exhaust gases exiting the fuel cell are fed to a catalytic reactor in the appropriate amount so as to not exceed the limits of inflammability for hydrogen (column 2 lines 57-64). In one embodiment, part of the fresh cathode gas feed to the fuel cell is diverted around the fuel cell and fed to the catalytic reactor (column 3 lines 5-14 and Figure 2) as an oxygen air supply.

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Yoshizumi et al. do not disclose supplying fresh cathode gas to the dilution reservoir. However, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify Yoshizumi et al. in view of Blaszczyk et al. to supply fresh cathode gas to the dilution chamber to ensure the proper amount of oxygen or air is present for diluting the hydrogen. Blaszczyk et al. do not explicitly teach that the cathode exhaust gas enters the catalytic reactor at the upper portion. However, it has been held by the courts that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

7. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizumi et al. (US 2002/0094469 A1) in view of Goto (JP 60-207255 A).

Yoshizumi et al. disclose a method of discharging hydrogen-off gas from a fuel cell by mixing the cathode gas and the purged hydrogen gas in a hydrogen diluter (paragraph 125). Yoshizumi et al. do not disclose the controller, adjustment valve and hydrogen concentration detector used to control the amount of agitating gas or cathode gas amount introduced to the hydrogen diluter.

With regard to Claim 18, Goto discloses the detection of the concentration of gas discharged from the fuel cell and controlling the amount of gas supply according to the detected value. A hydrogen concentration detector monitors the hydrogen content of the gas discharged from the fuel cell. The hydrogen concentration detector then provides an input to the controller that controls the amount of fuel gas supplied to the fuel cell via a flow control valve or adjustment valve. The amount of fuel gas that is

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supplied to the reservoir may be increased or decreased depending on the input the controller receives from the hydrogen concentration detector. See Abstract. At the time of the invention it would have been obvious to one of ordinary skill in the art to modify the hydrogen diluter system of Yoshizumi et al. to include a controller, adjustment valve and a hydrogen concentration detector such as taught by Goto in order to monitor and respond to hydrogen concentration levels in the discharge stream leaving the hydrogen diluter.

With regard to Claim 19, Goto discloses the hydrogen concentration detector controls the flow of cathode exhaust based on the hydrogen level detected in the hydrogen diluter discharge. The cathode exhaust is increased or decreased depending on the input provided to the controller from the hydrogen concentration detector. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the hydrogen diluter system of Yoshizumi et al to include a controller, adjustment valve, and hydrogen concentration detector such as taught by Goto in order to monitor and adjust (increase or decrease) the amount of cathode exhaust gas provided to the hydrogen diluter if the hydrogen concentration level in the discharge stream is higher than the predetermined acceptable limit. The purpose of adjusting the amount of cathode exhaust gas provided to the hydrogen diluter is to ensure that the hydrogen content of the discharge stream exiting the hydrogen diluter is at a safe (nonflammable) level.

With regard to Claim 20, Goto discloses the detection of the concentration of gas discharged from the fuel cell and controlling the amount of gas supply according to the

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detected value. The amount of fuel gas that is supplied to the reservoir may be increased or decreased depending on the input the controller receives from the hydrogen concentration detector. See Abstract. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the hydrogen diluter system of Yoshizumi et al to include a controller, adjustment valve, and hydrogen concentration detector such as taught by Goto in order to monitor and adjust (increase or decrease) the amount of cathode exhaust gas provided to the hydrogen diluter if the hydrogen concentration level in the discharge stream is higher than the predetermined acceptable limit. The purpose of adjusting the amount of cathode exhaust gas provided to the hydrogen diluter is to ensure that the hydrogen content of the discharge stream exiting the hydrogen diluter is at a safe (nonflammable) level.

***Allowable Subject Matter***

8. Claims 8-16 are allowed.
9. The following is an examiner's statement of reasons for allowance: the closest prior art disclosed above, does not teach or fairly suggest an exhaust gas process device for a fuel cell wherein the agitating gas is cathode exhaust gas supplied from a pipe branched off the primary cathode exhaust discharge (the cathode gas enters the diluter at two separate entry points). The closest prior art, Yoshizumi et al. (US 2002/0094469 A1) teaches supplying only one cathode exhaust process stream to the hydrogen dilute for diluting the purged hydrogen.



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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

10. Claims 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: the closest prior art, Yoshizumi et al. do not teach or fairly suggest wherein a pressure of cathode exhaust gas flowing through the exhaust gas pipe is lower at the reservoir than a pressure in the reservoir and wherein the exhaust gas pipe includes a smaller diameter portion disposed within the reservoir.

#### ***Double Patenting***

12. The Terminal Disclaimer submitted April 5, 2007, has been approved. Therefore the provisional non-statutory obviousness-type double patenting rejection has been withdrawn.

#### ***Response to Arguments***

13. Applicant's arguments filed March 22, 2007, have been fully considered but they are not persuasive.

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*Applicant's principal arguments are:*

*(a) The placement of the agitating gas introduction inlet is not a mere rearranging of parts.*

In response to Applicant's arguments, please consider the following comments:

(a) Applicant has not provided unexpected results that would occur by placing the agitating gas introduction inlet in a specific location.

### **Conclusion**

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-

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8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
PATRICK JOSEPH RYAN  
SUPERVISORY PATENT EXAMINER

Karie O'Neill  
Examiner  
Art Unit 1745

KAO